

CLAIMS

We claim:

1. A method of controlling bead shape in a steel alloy laser deposition process comprising laser melting a premixed titanium carbide powder and steel powder mixture on a steel surface using a shielding gas comprising 1 % to 100 % nitrogen.
2. The method of claim 1 wherein said shielding gas further comprises an inert gas.
3. The method of claim 1 wherein said shielding gas further comprises air.
4. A method of controlling bead shape in a steel alloy laser deposition process comprising laser melting an addition of material comprised of titanium carbide and steel on a steel surface in air.
5. A method for producing a high-hardness steel surface comprising the steps of:
 - a) introducing an addition of a powder mixture containing 10 to 60 weight percent titanium carbide powder and the balance steel onto a steel surface by preplacing said mixture on the surface, feeding said mixture into the interaction area, or combining the preplacing and feeding of the addition components;
 - b) laser melting said powder additions and a relatively small amount of the steel surface using 1 % to 100 % nitrogen as shielding gas; and
 - c) cooling at a rate such that a steel surface with fine titanium carbonitride particles is formed.